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Descriptive Title of the Invention:

Self-adherent roofing membrane without the need for a removable release liner

Cross Reference to Related Applications:

Patent search	:	Utility
Terms	:	Roofing & Silicone
CL	:	52, 62, 156, 264, 427, 428, 442, 524, 525

The use of silicone rubber sealant appears in the following US roofing patents which claim its usefulness for improving the following roofing needs : solar cells, gasket material, joint sealer, moisture vapor barriers, water repellents, paint leveling, base for electrodeposition of copper, binders, roofing plate knobs, electrical junction boxes, tile, adhesives, backing strips, valves, pigments, decorative chips, mold release, granules, lubricants, adhesive inhibitor, paint, coatings, fire retardants, panels, coal tar, foam, and protective removable release liners.

U. S. Patent Documents

Solar cell coating		
5,112,408	5/1992	Melchior
Gasket material		
5,970,667	10/1999	Thaler
6,102,794	8/2000	Cline
Joint sealers		
3,996,396	12/1976	Hansen
4,189,882	2/1980	Harrison
4,937,995	7/1990	Deffeyes
6,291,571	9/2001	Fisher
Moisture Vapor Barrier		
4,651,494	3/1987	VanWagoner
Water Repellent		
3,971,184	7/1976	VanWagoner
4,021,981	5/1977	VanWagoner
4,719,723	1/1988	VanWagoner
5,527,409	6/1996	Lanphier
5,837,363	11/1998	Colafati

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Paint Leveling		
4,827,686	5/1989	Stamper
Base for copper		
5,417,838	5/1995	Goleby
Binder		
5,822,943	10/1998	Frankoski
Roofing plate knobs		
4,754,589	7/1988	Leth
Electrical junction boxes		
6,155,006	12/2000	Mimura
6,182,403	2/2001	Mimura
Electrical junction boxes cont.		
6,311,436	11/2001	Mimura
6,336,304	1/2002	Mimura
Tile		
4,226,070	10/1980	Aragon
Adhesive		
5,253,461	10/1993	Janoski
Backing strips		
3,886,021	5/1975	Breckenfelder
3,973,887	8/1976	Breckenfelder
Valves		
4,557,081	12/1985	Kelly
4,736,562	4/1988	Kelly
Pigments		
5,035,748	7/1991	Burow
5,368,936	11/1994	Braunshweig
Paint		
5,571,596	11/1996	Johnson
Coating		
4,029,836	6/1977	Wieczorek
4,297,265	10/1981	Olsen

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Decorative chips		
5,630,677	5/1997	Barroso
Mold release		
4,028,450	6/1977	Gould
4,191,722	3/1980	Gould
4,273,106	6/1981	Gould
5,648,144	7/1997	Maurer
6,025,052	2/2000	Maurer
Granules		
3,888,176	6/1975	Horai
3,888,682	6/1975	Nelson
3,888,683	6/1975	Horai
3,894,877	7/1975	Nelson
4,218,502	8/1980	Graham
4,234,639	11/1980	Graham
4,452,961	6/1984	Koerner
4,496,476	12/1984	Fitsch
4,537,595	8/1985	Gruning
4,781,950	11/1988	Giesing
5,240,760	8/1993	George
5,286,544	2/1994	Graham
5,362,566	11/1994	George
6,235,372	5/2001	Joedicke
6,238,794	5/2001	Beesley
Lubricant		
4,519,175	5/1985	Resan
Adhesive Inhibitor		
4,803,111	2/1989	Mansell
Fire Retardant		
4,587,789	5/1986	Tomason
4,804,696	2/1989	Jolitz
Panels		
5,644,882	7/1997	Brown
Coal tar		
3,835,117	9/1974	Walaschek
3,897,380	7/1975	Walaschek

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Foam

3,958,373	5/1976	Stewart
4,063,395	12/1977	Stewart

Release liners

3,751,291	8/1973	Schroeder
3,937,640	2/1976	Tajima
4,039,706	8/1977	Tajima
4,045,265	8/1977	Tajima
4,055,453	10/1977	Tajima
4,091,135	5/1978	Tajima
4,135,022	1/1979	Kennepohl
4,588,637	5/1986	Chiu
4,636,414	1/1987	Tajima
4,717,614	1/1988	Bondoc
4,738,884	4/1988	Algrim
4,757,652	7/1988	Kalkanoglu
4,855,172	8/1989	Chiu
4,885,887	12/1989	Simmons
4,897,293	1/1990	Thessen
4,936,071	6/1990	Karrfalt
4,948,655	8/1990	Danese
5,095,068	3/1992	Chiu
5,204,148	4/1993	Alexander
5,216,053	6/1993	Jones
5,686,179	11/1997	Cotsakis
5,733,621	3/1998	Cotsakis
5,800,891	9/1998	Wasitis
5,843,552	12/1998	Karrfalt
5,916,654	6/1999	Phillips
6,120,869	9/2000	Cotsakis
6,228,785	5/2001	Miller

Statement regarding Federal sponsored R & D

The United States Federal Government did not sponsor the research and development for this present invention.

Reference to sequence listing, a table, or computer program Listing appendix

None.

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Background of the Invention

By 1990, the majority of the recreational vehicle manufacturers were and continue to use rubber roofing membranes. The major problem experienced with rubber roofs is that they blow off when the vehicle is traveling at highway speeds into the wind on a windy day. The primary reason they blow off is inadequate adhesion due to poor adhesives and/ or poor adhesive application. The failures occur when the installer does not use enough adhesive or when the installer uses too much adhesive. The difficulty is adhering to rubber which usually is covered with mica powder so the roll of rubber does not stick to itself during transportation. It is too difficult and time consuming to clean the mica from the rubber before applying adhesive.

Objectives of the Invention: It is, therefore, a primary objective of the present invention to provide an improved rubber roofing membrane--one that is ultraviolet, ozone, and water resistant while being flexible and strong and self-adherent. It is also an aim of the invention to provide a roofing membrane that can easily be installed at virtually any temperature extreme which is encountered in most parts of the world.

Brief Summary of the Invention

The present invention encompasses a non-blocking roll of seamless silicone rubber that secures itself to a roofing substrate. It is novel because it needs no removable release liner to keep its pressure sensitive adhesive underside layer from adhering to its top surface. It has been found that the resultant roofing rubber membrane exhibits superior properties in terms of light weight, tear resistance, flexibility, slip resistance, wind resistance, tensile strength, sound transmission, reflectance, texture, insulation, adhesion, weatherability, ozone resistance, ultraviolet resistance, wind uplift resistance and ease of application. It installs quicker than membranes that need release liners removed, glue applied, or mechanical fasteners secured.

Brief Description of the Drawings

None filed

Detailed Description

Silicone rubber is used to make release liners for pressure sensitive adhesives because silicone and pressure sensitive adhesives do not bond very well to each other. This invention requires a non-woven scrim as a cuppling agent for both the silicone rubber and the pressure sensitive adhesive. The scrim of choice is made with glass fibers. The strength and flexibility of the scrim is primarily determined by the amount, length and diameter of the glass fibers. Non-woven fiberglass scrims are produced by various manufactures such as Owens Corning Composits Division, 2790 Columbus Road, Route 16, Granville, Ohio, and are available in strengths ranging from a few pounds to several hundred pounds per linear inch. The scrim in addition to being a cuppling agent is

primarily responsible for the roofing membranes tensile strength, puncture resistance, and tear resistance.

Silicone rubber sealant is applied to the top surface of the non-woven fiberglass scrim and made to penetrate 1/10 to 9/10 of the way into the thickness of the scrim, thus no silicone rubber sealant reaches the bottom or underside surface of the scrim. Silicone rubber sealant needs to penetrate into the fiberglass scrim in order to obtain maximum reinforcement by the scrim. Silicone rubber sealant applied only to the top surface of the non-woven fiberglass scrim and not made to penetrate 1/10 to 9/10 of the way into the thickness of the scrim will result in a weak top surface that has poor adhesion. Silicone rubber sealants are produced by various manufacturers such as GE Sealants, Huntersville, NC. Silicone rubber sealant contributes to the roofing membranes ultraviolet, ozone, and water resistance along with cold and hot temperature performance and flexibility. It has superior weatherability and decorative properties combined with dirt and chemical resistance.

To the remaining 9/10 to 1/10 of the scrim's thickness and to the bottom surface of the scrim is applied pressure sensitive adhesive. The pressure sensitive adhesive secures the membrane to the roof substrate. It also contributes to the membranes ultraviolet, ozone, and water resistance along with cold and hot temperature performance and flexibility. It also has insulation and sound deadening properties.

This construction results into a self adherent roofing membrane that can be packaged and transferred in roll form without the need to include an additional release liner sheet or non-blocking material such as talc, mica, or clay powder.

SCRIM: The fibers that make up the scrim and the scrim's thickness and strength are chosen based on the intended life of the membrane. A roofing membrane or covering that is intended for temporary use (e.g., Emergencies) may have fibers made of paper, celulose, cotton, rayon, etc. Temporary membranes may be relatively thin (e.g., less than 0.010 inch) and relatively weak (e.g., less than 25 pounds/liner inch). Roofing membranes that must perform for many years should have fibers made of polyester, water resistant metal such as stainless steel, nylon, ceramic, kelvar, glass, etc. Long lasting membranes should have thickness over 0.010 inch and higher strength (e.g., over 25 pounds/linear inch). Preferred scrim for the present invention: Type: non-woven fiberglass, Thickness: 0.010 to 0.040 inches, Strength: 25 to 200 pounds/linear inch.

SILICONE RUBBER SEALANT: Many adhesive and sealant companies formulate and sell silicone rubber sealant. Some of the major manufactures at present are GE, Crompton Corporation, Dow Corning Corp, Gelest Inc., hanse chemie Gmbh, Kion Corporation, Struktol Co., Wright Corp. A roofing membrane or covering that is intended for temporary use may be made with lower performance silicone rubber sealant. Roofing membranes that must perform for many years should be made with high performance silicone rubber sealant such as GE Type I and Type II 100% silicone rubber sealant. Preferred silicone rubber sealant for the present invention: 100% silicone rubber sealant (e.g., Type I or Type II manufactured by GE Sealants & Adhesives).

PRESSURE SENSITIVE ADHESIVES: Pressure sensitive adhesives are adhesives that bond substrates together by making contact and applying pressure. A roofing membrane or covering intended for temporary use may be made with weak pressure sensitive adhesive that does not resist UV light, heat, cold, water, ozone, etc. Examples of such pressure sensitive adhesives include: plasticized SBR rubber, plasticized hydrocarbon resins, plasticized neoprene rubber, polybutene resin, etc. Roofing membranes that must perform for many years should be made with pressure sensitive adhesives that are strong in cold and hot climates and that resist UV light, water, and ozone. Two examples of such pressure sensitive adhesives are acrylic and styrene acrylic that have Tg's from –40c to –50c. Preferred pressure sensitive adhesive for the present invention: acrylic (Tg –40c to-50c).

Claim(s)

What is claimed is:

(1) A roll of roofing membrane composed of non-woven fiberglass scrim covered and saturated with silicone rubber sealant on the top surface to a depth of 1/10 to 9/10 of the way into the thickness of the scrim and covered and saturated with pressure sensitive adhesive on the bottom or underside surface to the remaining 9/10 to 1/10 of the scrim's thickness.

(2) The invention recited in Claim (1) wherein the pressure sensitive adhesive is acrylic having a Tg from about –40C to –50C.

(3) The invention recited in Claim (1) wherein the fiberglass scrim is from about 0.010 inches to 0.040 inches thick.

Abstract of the Disclosure

The present invention relates to a non-blocking roll of roofing membrane employing a combination of silicone rubber sealant, non-woven fiberglass scrim and pressure sensitive adhesive. The method utilizes a process by which silicone rubber sealant is applied to the top surface of the non-woven fiberglass scrim and made to penetrate 1/10 to 9/10 of the way into the thickness of the scrim, thus no silicone rubber sealant reaches the bottom or underside surface of the scrim. To the remaining 9/10 to 1/10 of the scrim's thickness and to the bottom surface of the scrim is applied pressure sensitive adhesive. This construction results into a self adherent roofing membrane that can be packaged and transferred in roll form without the need to include an additional release liner sheet or non-blocking material such as talc, mica, or clay powder.